CLAIMS

WE CLAIM:

1. A transgenic plant cell transformed by a Signal Transduction Stress-Related Protein (STSRP) coding nucleic acid, wherein expression of the nucleic acid in the plant cell results in increased tolerance to an environmental stress as compared to a wild type variety of the plant cell.

2. The transgenic plant cell of Claim 1, wherein the STSRP is selected from the group consisting of a Phospholipase C-1 (PLC-1) protein; Phospholipase C-2 (PLC-2) protein; a 14-3-3 Protein-1 (14-3-3P-1); a 14-3-3 Protein-2 (14-3-3P-2); and a Ca^{2+} Binding Protein-1 (CBP-1); and orthologs thereof.

3. The transgenic plant cell of Claim 2, wherein the STSRP is selected from the group consisting of PLC-1 as defined in SEQ ID NO:11; PLC-2 as defined in SEQ ID NO:12; 14-3-3P-1 as defined in SEQ ID NO:13; 14-3-3P-2 as defined in SEQ ID NO:14; and CBP-1 as defined in SEQ ID NO:15.

4. The transgenic plant cell of Claim 2, wherein the STSRP coding nucleic acid is selected from the group consisting of PLC-1 as defined in SEQ ID NO:6; PLC-2 as defined in SEQ ID NO:7; 14-3-3P-1 as defined in SEQ ID NO:8; 14-3-3P-2 as defined in SEQ ID NO:9; and CBP-1 as defined in SEQ ID NO:10.

5. The transgenic plant cell of Claim 1, wherein the STSRP coding nucleic acid hybridizes under stringent conditions to a sequence of SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10.

6. The transgenic plant cell of Claim 1, wherein the environmental stress is selected from the group consisting of salinity, drought and temperature.

7. The transgenic plant cell of Claim 1, wherein the plant is a monocot.

8. The transgenic plant cell of Claim 1, wherein the plant is a dicot.

9. The transgenic plant cell of Claim 1, wherein the plant is selected from the group consisting of maize, wheat, rye, oat, triticale, rice, barley, soybean, peanut, cotton, rapeseed, canola, manihot, pepper, sunflower, tagetes, solanaceous plants, potato,

tobacco, eggplant, tomato, Vicia species, pea, alfalfa, coffee, cacao, tea, Salix species, oil palm, coconut, perennial grass and forage crops.

10. A transgenic plant comprising a plant cell according to any of Claims 1-9.

11. A seed produced by a transgenic plant comprising a plant cell according to any of Claims 1-9, wherein the seed is true breeding for an increased tolerance to environmental stress as compared to a wild type variety of the plant cell.

12. An agricultural product produced by the transgenic plant or seed of Claims 10 or 11.

13. An isolated Signal Transduction Stress-Related Protein (STSRP) wherein the STSRP is selected from the group consisting of a Phospholipase C-1 (PLC-1) protein; a Phospholipase C-2 (PLC-2) protein; a 14-3-3 Protein-1 (14-3-3P-1); a 14-3-3 Protein-2 (14-3-3P-2); and a Ca^{2+} Binding Protein-1 (CBP-1); and orthologs thereof.

14. The isolated STSRP of Claim 13, wherein the STSRP is selected from the group consisting of PLC-1 as defined in SEQ ID NO:11; PLC-2 as defined in SEQ ID NO:12; 14-3-3P-1 as defined in SEQ ID NO:13; 14-3-3P-2 as defined in SEQ ID NO:14; and CBP-1 as defined in SEQ ID NO:15.

15. An isolated Signal Transduction Stress-Related Protein (STSRP) coding nucleic acid, wherein the STSRP coding nucleic acid codes for a STSRP selected from the group consisting of a Phospholipase C-1 (PLC-1) protein; a Phospholipase C-2 (PLC-2) protein; a 14-3-3 Protein-1 (14-3-3P-1); a 14-3-3 Protein-2 (14-3-3P-2); and a Ca^{2+} Binding Protein-1 (CBP-1); and orthologs thereof.

16. The isolated STSRP coding nucleic acid of Claim 15, wherein the STSRP coding nucleic acid is selected from the group consisting of PLC-1 as defined in SEQ ID NO:6; PLC-2 as defined in SEQ ID NO:7; 14-3-3P-1 as defined in SEQ ID NO:8; 14-3-3P-2 as defined in SEQ ID NO:9; and CBP-1 as defined in SEQ ID NO:10.

17. The isolated STSRP coding nucleic acid of Claim 15, wherein the STSRP coding nucleic acid hybridizes under stringent conditions to a sequence of SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10.

18. An isolated recombinant expression vector comprising a nucleic acid of Claims 15, 16 or 17, wherein expression of the vector in a host cell results in increased tolerance to environmental stress as compared to a wild type variety of the host cell.

19. A method of producing a transgenic plant containing a Signal Transduction Stress-Related Protein (STSRP) coding nucleic acid, wherein expression of the nucleic acid in the plant results in increased tolerance to environmental stress as compared to a wild type variety of the plant, comprising, transforming a plant cell with an expression vector comprising the nucleic acid, generating from the plant cell a transgenic plant with an increased tolerance to environmental stress as compared to a wild type variety of the plant.

20. The method of Claim 19, wherein the STSRP is selected from the group consisting of Phospholipase C-1 (PLC-1) protein; a Phospholipase C-2 (PLC-2) protein; a 14-3-3 Protein-1 (14-3-3P-1); a 14-3-3 Protein-2 (14-3-3P-2); and a Ca^{2+} Binding Protein-1 (CBP-1); and orthologs thereof.

21. The method of Claim 20, wherein the STSRP is selected from the group consisting of PLC-1 as defined in SEQ ID NO:11; PLC-2 as defined in SEQ ID NO:12; 14-3-3P-1 as defined in SEQ ID NO:13; 14-3-3P-2 as defined in SEQ ID NO:14; and CBP-1 as defined in SEQ ID NO:15.

22. The method of Claim 20, wherein the STSRP coding nucleic acid is selected from the group consisting of PLC-1 as defined in SEQ ID NO:6; PLC-2 as defined in SEQ ID NO:7; 14-3-3P-1 as defined in SEQ ID NO:8; 14-3-3P-2 as defined in SEQ ID NO:9; and CBP-1 as defined in SEQ ID NO:10.

23. The method of Claim 19, wherein the STSRP coding nucleic acid hybridizes under stringent conditions to a sequence of SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10.

24. A method of modifying stress tolerance of a plant comprising, modifying the expression of a Signal Transduction Stress-Related Protein (STSRP) in the plant.

25. The method of Claim 24, wherein the STSRP is selected from the group consisting of Phospholipase C-1 (PLC-1) protein; a Phospholipase C-2 (PLC-2) protein; a 14-3-3 Protein-1 (14-3-3P-1); a 14-3-3 Protein-2 (14-3-3P-2); and a Ca^{2+} Binding Protein-1 (CBP-1); and orthologs thereof.

26. The method of Claim 25, wherein the STSRP is selected from the group consisting of PLC-1 as defined in SEQ ID NO:11; PLC-2 as defined in SEQ ID NO:12; 14-3-3P-1 as defined in SEQ ID NO:13; 14-3-3P-2 as defined in SEQ ID NO:14; and CBP-1 as defined in SEQ ID NO:15.

27. The method of Claim 25, wherein the STSRP coding nucleic acid is selected from the group consisting of PLC-1 as defined in SEQ ID NO:6; PLC-2 as defined in SEQ ID NO:7; 14-3-3P-1 as defined in SEQ ID NO:8; 14-3-3P-2 as defined in SEQ ID NO:9; and CBP-1 as defined in SEQ ID NO:10.

28. The method of Claim 24, wherein the STSRP coding nucleic acid hybridizes under stringent conditions to a sequence of SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, or SEQ ID NO:10.

29. The method of Claim 24, wherein the stress tolerance is decreased.

30. The method of Claim 24, wherein the plant is not transgenic.

31. The method of Claim 24, wherein the plant is transgenic.

32. The method of Claim 31, wherein the plant is transformed with a promoter that directs expression of the STSRP.

33. The method of Claim 32, wherein the promoter is tissue specific.

34. The method of Claim 32, wherein the promoter is developmentally regulated.

35. The method of Claim 24, wherein STSRP expression is modified by administration of an antisense molecule that inhibits expression of STSRP.